

WHAT IS CLAIMED IS:

1. A method of identifying the presence of a biomolecule on a support comprising the steps of:

(a) providing a support having disposed thereon a biomolecule;

(b) contacting the biomolecule with a collection of phage, wherein individual phage in the collection have a phage-expressed binding protein so that the collection of phage in aggregate comprises a collection of phage-expressed binding proteins, and wherein contact of the biomolecule and the collection of phage results in a non-bound population of phage and a bound population of phage;

(c) removing the non-bound population of phage in a manner that retains the bound population of phage;

(d) placing the bound population of phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(e) detecting the replicated population of phage, whereby the presence of the biomolecule is identified.

2. The method of Claim 1, wherein the biomolecule is selected from the group consisting of a lipid, a protein, and a nucleic acid.

3. The method of Claim 1, wherein the biomolecule is one of a plurality of electrophoretically separated biomolecules.

4. The method of Claim 1, wherein the support is selected from the group consisting of a gel, a membrane, a filter, a paper, a chromatography matrix, and a chromatography resin.

5. The method of Claim 4, wherein the gel has a plastic backing.

6. The method of Claim 1, wherein the unbound population of phage are removed by washing with a buffer.

7. The method of Claim 1, wherein the bound population of phage is replicated on a lawn of host bacteria.

8. The method of Claim 1, wherein the bound population of phage is overlaid with a bacterial strain that is a host for the phage.

9. The method of Claim 1, wherein the biomolecule is detected by observing bacterial cell lysis.

10. The method of Claim 1 further comprising the step of isolating at least one phage from the replicated population of phage.

11. The method of Claim 10, further comprising the step of incorporating the phage into a pharmaceutical product.

12. The method of Claim 10, further comprising the step of incorporating the phage into a diagnostic kit.

13. A method of identifying the presence of a biomolecule on a support comprising the steps of:

(a) providing a support having disposed thereon a biomolecule;

(b) contacting the biomolecule with a collection of phage, wherein individual phage in the collection are joined to a protein that can bind to the biomolecule so that the collection of phage in aggregate comprises a collection of proteins that can bind to the biomolecule, and wherein contact of the biomolecule and the collection of phage results in a non-bound population of phage and a bound population of phage;

(c) removing the non-bound population of phage in a manner that retains the bound population of phage;

(d) placing the bound population of phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(e) detecting the replicated population of phage, whereby the presence of the biomolecule is identified.

14. The method of Claim 13, wherein the protein is joined to the phage by a linker.

15. The method of Claim 13, wherein the protein is avidin or strepavidin or a derivative thereof.

16. A method of identifying the presence of a biomolecule on a support comprising the steps of:

(a) providing a support having disposed thereon a biomolecule;

(b) contacting the biomolecule with a collection of phage, wherein individual phage in the collection are joined to a nucleic acid that can bind to the biomolecule so that the collection of phage in aggregate comprises a collection of nucleic acids that can bind to the biomolecule, and wherein contact of the biomolecule and the collection of phage results in a non-bound population of phage and a bound population of phage;

(c) removing the non-bound population of phage in a manner that retains the bound population of phage;

(d) placing the bound population of phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(e) detecting the replicated population of phage, whereby the presence of the biomolecule is identified.

17. The method of Claim 16, wherein the nucleic acid is joined to the phage by a linker.

18. The method of Claim 16, wherein the linker comprises avidin or strepavidin or a derivative thereof and the nucleic acid is biotinylated.

19. A method of identifying the presence of a biotinylated biomolecule on a support comprising:

(a) providing a support having disposed thereon a biotinylated biomolecule;

(b) contacting the biotinylated biomolecule with a collection of phage, wherein individual phage in the collection have a phage-expressed binding protein that binds to biotin, and wherein contact of the biotinylated biomolecule and the collection of phage results in a non-bound population of phage and a bound population of phage;

(c) removing the non-bound population of phage in a manner that retains the bound population of phage;

(d) placing the bound population of phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(e) detecting the replicated population of phage, whereby the presence of the biotinylated biomolecule is identified.

20. The method of Claim 14, wherein the phage-expressed binding protein comprises avidin or strepavidin or a derivative thereof.

21. A method of identifying the presence of a biomolecule on a support comprising:

(a) providing a support having disposed thereon a first biomolecule;

(b) contacting the first biomolecule with a second biomolecule under conditions that promote the formation of a complex comprising the first biomolecule and the second biomolecule;

(c) contacting the complex with a collection of phage, wherein individual phage in the collection have a phage-expressed binding protein that binds to the second biomolecule, and wherein contact of the second biomolecule and the collection of phage results in a non-bound population of phage and a bound population of phage;

(d) removing the non-bound population of phage in a manner that retains the bound population of phage;

(e) placing the bound population of phage with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(f) detecting the replicated population of phage, whereby the presence of the first biomolecule is identified.

22. A method of determining whether a target biomolecule is present in a biological sample comprising:

(a) providing a support having disposed thereon a biological sample that can have a target biomolecule;

(b) contacting the biological sample with a phage, having disposed on an outer surface a binding protein specific for the target biomolecule, under conditions that permit the phage to bind to any of the target biomolecule that is present in the biological sample, thereby resulting in a bound phage;

(c) placing the bound phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce replicated phage;

(d) detecting the replicated phage; and

(e) determining that the target biomolecule is present in the biological sample if replicated phage are detected in step (d).

23. A method of detecting electrophoretically separated biomolecules comprising the steps of:

(a) obtaining a solid matrix having disposed thereon a plurality of electrophoretically separated biomolecules;

(b) contacting the solid matrix with a collection of phage, wherein individual phage in the collection have a phage-expressed binding protein so that the collection of phage in aggregate comprises a collection of phage-expressed binding proteins, and wherein contact of the solid matrix and the collection of phage results in a non-bound population of phage and a bound population of phage;

(c) removing the non-bound population of phage to leave the bound population of phage localized to positions on the solid matrix corresponding to positions of the electrophoretically separated biomolecules;

(d) placing the bound population of phage together with a host for the phage under conditions that permit the bound phage to infect the host so as to produce a replicated population of phage; and

(e) detecting the replicated population of phage, whereby electrophoretically separated biomolecules are detected.

24. A biomolecular complex comprising:

a target biomolecule;

a phage having a phage-expressed binding protein that can bind to the target biomolecule or having joined thereto a linked or un-linked protein or nucleic acid that can bind to the target biomolecule, wherein the phage-expressed binding protein or the linked or unlinked protein or nucleic acid is bound to the target biomolecule to provide a bound phage; and

a host bacterial cell that is a host for the phage, under conditions that permit the bound phage to infect the host.

25. A method of identifying a target biomolecule in an assay comprising the step of forming the biomolecular complex of Claim 24 on a support.

26. A method of identifying a polymorphism in a subject comprising:

providing a biological sample containing polynucleotides from the subject;

forming the biomolecular complex of Claim 24, wherein the polynucleotides of the biological sample are the target biomolecule; and

detecting lysis of the bacterial cell.